

11 the distal end having a rotatable reaming head and the proximal end having [connecting means for
12 connection] a first mechanism configured to connect to a drill, a portion of the body including
13 [engagement means for engagement] a second mechanism configured to engage with the housing,
14 the reamer being sized and shaped for insertion through the bore of the housing and the sleeve;
15 d) whereas the minimally invasive reaming assembly is configured to create
16 an entry portal into the canal of a bone and to provide a working channel in which a plurality of
17 reamers of graduated sizes are inserted for progressively reaming the canal of a bone.

1 2. The assembly of claim 1, wherein the housing and sleeve are separate elements.
2 in which the bottom portion of the housing includes [engagement means for engaging with an
3 engagement means] a second connecting mechanism configured to engage with a sleeve
4 connecting mechanism on the proximal end of the sleeve for releaseable attachment of the housing
5 to the sleeve.

1 3. The assembly of claim 2, wherein the [engagement means] sleeve connecting
2 mechanism of the proximal end of the sleeve includes threading for engaging with a threaded
3 portion on a surface of the housing bore and a ring of horizontally placed teeth positioned below
4 the threading on the sleeve.

1 4. The assembly of claim 3, wherein the [engagement means] second connecting
2 mechanism of the bottom portion of the housing further includes a spring loaded lock[ing means]
3 for releaseably engaging the horizontally placed teeth on the sleeve after the sleeve has been
4 threaded into the housing.

1 5. The assembly of claim 1, wherein the [engagement means] first connecting
2 mechanism of the top portion of the housing includes a notch sized and shaped for mating with
3 a tab placed on [an annular collar of] the inner reamer.

1 6. The assembly of claim 5, wherein the [engagement means] first connecting
2 mechanism of the top portion of the housing further includes a spring loaded release [means] for
3 releasing the tab on [the annular collar] from the notch of the housing in order to remove the inner

19

reamer from the housing and the sleeve.

8. The assembly of claim 1, used in combination with a positioning apparatus configured to locate an entry portal in a patient's bone, the apparatus comprising:

a) an elongated cylindrically-shaped hollow sheath having a proximal end, a distal end, and an upper and lower portion, the upper portion including at least one generally circular opening in the sheath;

b) an elongated handle having a proximal and distal end [and a through bore], the distal end including a [connecting means for] mechanism configured to connect[ing] and disconnect[ing] the handle to the sheath;

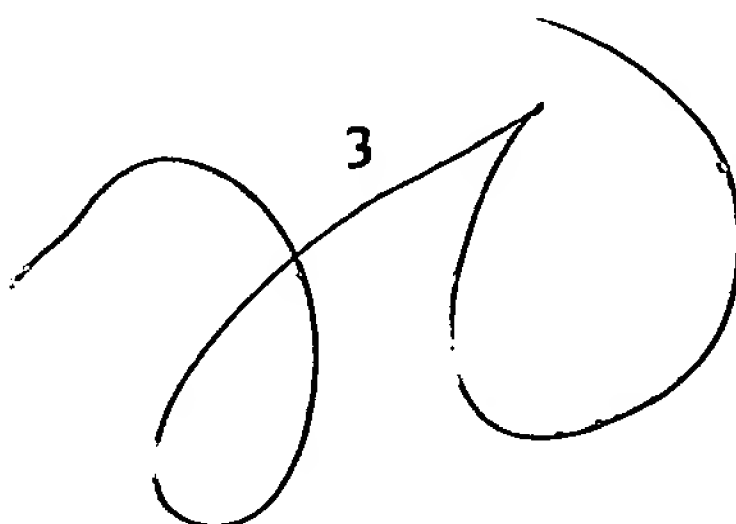
c) an elongated cylindrically-shaped tube having a proximal and distal end, the distal end having a [conical] tip with a plurality of openings, [the proximal end including an annular collar having a greater diameter than the tube,] the tube having a central longitudinal axis;

d) the elongated tube including a plurality of openings at its proximal end, [at least one cylindrical hub having a plurality of openings being placed longitudinally between the proximal and distal ends of the elongated tube,] the plurality of openings of the proximal end[, the at least one hub] and the [conical] tip being aligned along parallel lines that are parallel with the central longitudinal axis of the tube;

e) the elongated tube being sized and shaped for removable insertion into the hollow sheath and the hollow sheath being sized and shaped for removable insertion of the assembly of claim 1 into the hollow sheath;

f) wherein the combination of the assembly of claim 1 and the positioning apparatus allows for the correct placement of an entry portal into a patient's bone, the cutting of the entry portal into the bone canal and the reaming of the canal through the sleeve.

9. The assembly of claim 8, wherein the housing and sleeve are separate elements in which the bottom portion of the housing includes [engagement means for engaging with an engagement means] a second connecting mechanism configured to engage with a sleeve connecting mechanism of the proximal end of the sleeve for releaseable attachment of the housing to the sleeve.



1 10. The assembly of claim 9, wherein the [engagement means] sleeve connecting
2 mechanism of the proximal end of the sleeve includes threading for engaging with a threaded
3 portion on a surface of the housing bore and a ring of horizontally placed teeth positioned below
4 the threading on the sleeve.

1 11. The assembly of claim 10, wherein the [engagement means] second connecting
2 mechanism of the bottom portion of the housing further includes a spring loaded lock[ing means]
3 for releaseably engaging the horizontally placed teeth on the sleeve after the sleeve has been
4 threaded into the housing.

1 12. The assembly of claim 8, wherein the [engagement means] first connecting
2 mechanism of the top portion of the housing includes a notch sized and shaped for mating with
3 a tab [placed on an annular collar] of the inner reamer.

1 13. The assembly of claim 12, wherein the [engagement means] first connecting
2 mechanism of the top portion of the housing further includes a spring loaded release [means] for
3 releasing the tab [on the annular collar] from the notch of the housing in order to remove the inner
4 reamer from the housing and the sleeve.

5 15. The assembly of claim 8, wherein the elongated handle is configured to allow for
6 the suction of fluids from the reaming site up through the sleeve and out the [bore of] handle.

1 16. A minimally invasive method of creating an entry portal into the canal of a bone
2 and providing a working channel in which to ream the canal of the bone, the method comprising
3 the steps of:

- 4 a) locating an entry portal in a bone of a patient;
5 b) inserting a selected guide pin in the bone at the site of the entry portal;
6 c) creating a minimally invasive entry portal in the bone with a reaming
7 assembly, with the guide pin acting as a guide for the assembly, the reaming assembly comprising:
8 i) an elongated cylindrically-shaped hollow sleeve having a proximal
9 and a distal end, the distal end having a plurality of cutting blades;

10 ii) a housing adjacent to the sleeve, the housing having a top portion,
11 a bottom portion and a through bore, the top portion including [releaseable engagement means
12 for engagement with] a first connecting mechanism configured to releasably engage an inner
13 reamer;

14 iii) an inner reamer having an elongated cannulated body and proximal
15 and distal ends, the distal end having a rotatable reaming head and the proximal end having
16 [connecting means for connection] a first mechanism configured to connect to a drill, a portion
17 of the body including [engagement means for engagement] a second mechanism configured to
18 engage with the housing, the reamer being sized and shaped for insertion through the bore of the
19 housing and the sleeve;

20 d) removing the guide pin and the inner reamer from the assembly while
21 leaving the assembly in the entry portal in the bone;

22 e) inserting selected progressively larger sized reamers through the assembly
23 to ream the canal of the bone to a larger diameter;

24 f) removing the assembly from the bone upon completion of the canal
25 preparation; and

26 g) inserting an intramedullary nail into the prepared canal.

1 17. The method of claim 16, including the steps of:

2 a) locating the entry portal of the bone with an entry portal tool, the tool
3 comprising:

4 i) an elongated cylindrically-shaped hollow sheath having a proximal
5 end, a distal end, and an upper and lower portion, the upper portion including at least one
6 generally circular opening in the sheath;

7 ii) an elongated handle having a proximal and distal end [and a through
8 bore], the distal end including a [connecting means for] mechanism configured to connect[ing]
9 and disconnect[ing] the handle to the sheath;

10 iii) an elongated cylindrically-shaped tube having a proximal and distal
11 end, the distal end having a [conical] tip with a plurality of openings, [the proximal end including
12 an annular collar having a greater diameter than the tube,] the tube having a central longitudinal
13 axis;

14 iv) the elongated tube including a plurality of openings at its proximal
15 end, [at least one cylindrical hub having a plurality of openings being placed longitudinally
16 between the proximal and distal ends of the elongated tube,] the plurality of openings of the
17 proximal end[, the at least one hub] and the [conical] tip being aligned along parallel lines that are
18 parallel with the central longitudinal axis of the tube; and

19 v) the elongated tube being sized and shaped for removable insertion
20 into the hollow sheath and the hollow sheath being sized and shaped for removable insertion of
21 the assembly of claim 15 into the hollow sheath;

22 b) removing the elongated tube from the sheath; and

23 c) inserting the reaming assembly into the sheath and over the guide pin
24 inserted into the bone.

1 18. The method of claim 17, further including the steps of:

2 a) making an appropriate incision in a patient;

3 b) inserting the entry portal tool into the incision;

4 c) placing at least one guide pin through a selected one of the plurality of
5 openings in the elongated tube;

6 d) evaluating the position of the guide pin [with fluoroscopy means]; and

7 e) inserting the at least one guide pin into the bone.

1 19. The method of claim 16 and 17, further including the step of applying suction to
2 the handle of the entry portal tool in order to suction fluids from a reaming site up through the
3 sleeve and out through the [bore of the] handle.

1 20. A minimally invasive reaming assembly for creating an entry portal into the canal
2 of a bone and providing a working channel in which to ream the canal of a bone, the assembly
3 comprising:

4 a) an elongated cylindrically-shaped hollow sleeve having a proximal and a
5 distal end, the distal end having a plurality of cutting blades;

6 b) a [releaseable engagement means] connecting mechanism on the proximal
7 end of the sleeve configured to engage [for releaseable engagement] with an inner reamer;

6

